

# EXERCISES

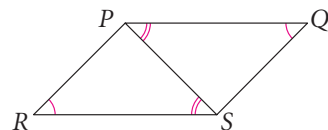
For more practice, see *Extra Practice*.

## Practice and Problem Solving

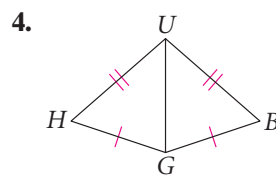
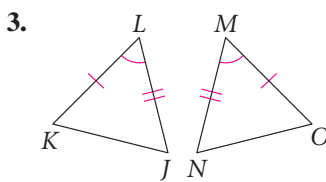
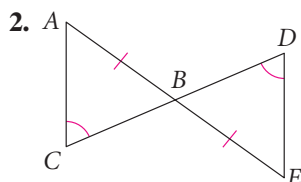
### A Practice by Example

**Example 1**  
(page 203)

1. The diagram provides enough information for you to conclude that  $\triangle QPS \cong \triangle RSP$  by AAS. What other pairs of sides and angles can you conclude are congruent by CPCTC?



**Developing Proof** State why the two triangles are congruent. Give the congruence statement. Then tell what other parts are congruent by CPCTC.



5. For  $\triangle RST$  and  $\triangle XYZ$ ,  $\angle R \cong \angle X$ ,  $\angle S \cong \angle Y$ , and  $\overline{ST} \cong \overline{YZ}$ . What can you say about the exterior angles at  $T$  and  $Z$ ? Explain.

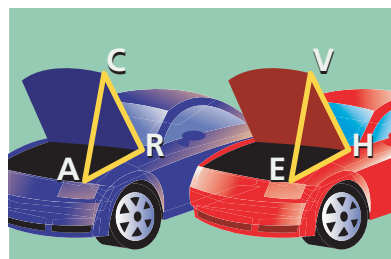
6. **Developing Proof** Two cars of the same model have hood braces that are identical, connect to the body of the car in the same place, and fit into the same slot in the hood.

**Given:**  $\overline{CA} \cong \overline{VE}$ ,  $\overline{AR} \cong \overline{EH}$ ,  $\overline{RC} \cong \overline{HV}$

Complete the proof that the hood braces hold the hoods open at the same angle.

**Prove:**  $\angle ARC \cong \angle EHV$

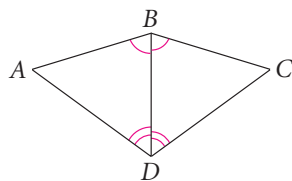
**Proof:** It is given that the three sides of the triangles are congruent, so  $\triangle ARC \cong \triangle EHV$  by **a.** ?. Thus,  $\angle ARC \cong \angle EHV$  by **b.** ?.



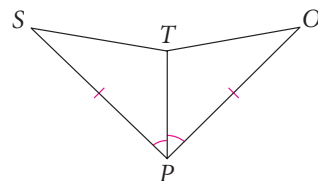
**Example 2**  
(page 204)

**Developing Proof** Explain how you can use SSS, SAS, ASA, or AAS with CPCTC to prove the statement true.

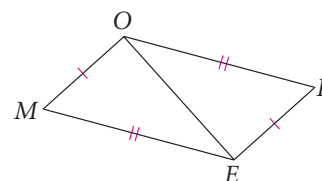
7.  $\overline{AB} \cong \overline{CB}$



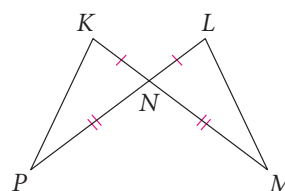
9.  $\angle S \cong \angle O$



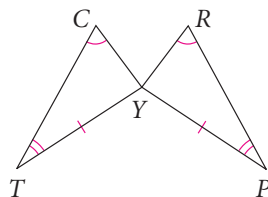
8.  $\angle M \cong \angle R$



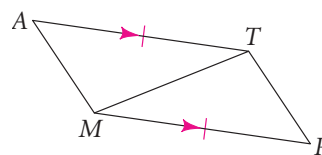
10.  $\overline{KP} \cong \overline{LM}$



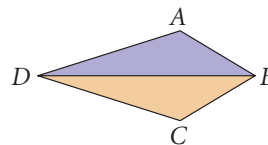
11.  $\overline{CT} \cong \overline{RP}$



12.  $\angle AMT \cong \angle RTM$



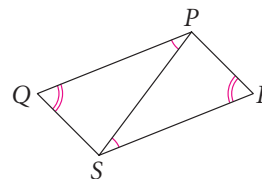
13. Karen cut this pattern for the stained glass shown here so that  $AB = CB$  and  $AD = CD$ . Must  $\angle A$  be congruent to  $\angle C$ ? Explain.



14. **Developing Proof** Complete the two-column proof by filling in the blanks.

**Given:**  $\angle QPS \cong \angle RSP$ ,  $\angle Q \cong \angle R$

**Prove:**  $\overline{PQ} \cong \overline{SR}$



Statements	Reasons
1. $\angle QPS \cong \angle RSP$	a. ?
2. $\angle Q \cong \angle R$	b. ?
3. $\overline{PS} \cong \overline{PS}$	c. ?
4. $\triangle PQS \cong \triangle SRP$	d. ?
5. $\overline{PQ} \cong \overline{SR}$	5. CPCTC



### Need Help?

For Reason 4, look at Statements 1–3.



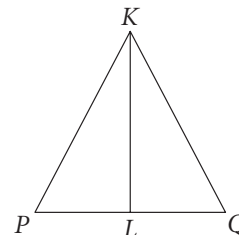
### Apply Your Skills

**Developing Proof** Copy and mark the figure to show the given information. Explain how you would use SSS, SAS, ASA, or AAS with CPCTC to prove  $\angle P \cong \angle Q$ .

15. **Given:**  $\overline{PK} \cong \overline{QK}$ ,  $\overline{KL}$  bisects  $\angle PKQ$ .

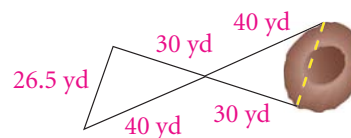
16. **Given:**  $\overline{KL}$  is the perpendicular bisector of  $\overline{PQ}$ .

17. **Given:**  $\overline{KL} \perp \overline{PQ}$ ,  $\overline{KL}$  bisects  $\angle PKQ$ .



18. **Earth Science** Some distances are best measured indirectly.

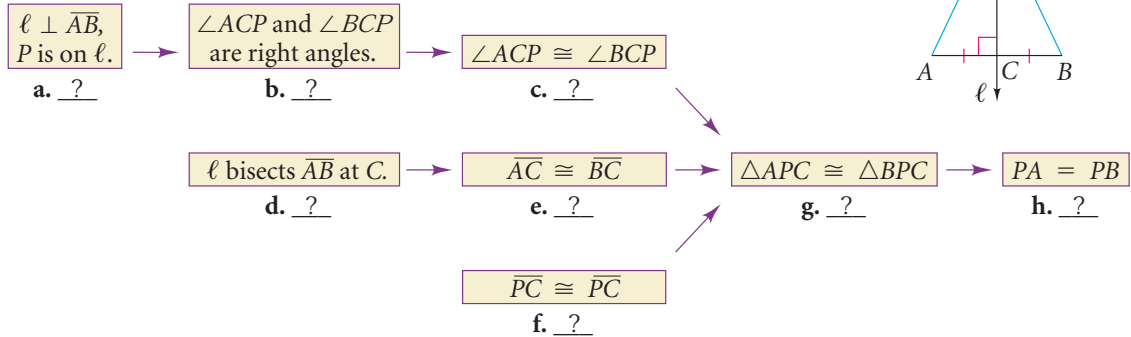
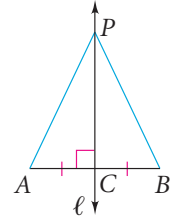
A geometry class indirectly measured the distance across a sinkhole. The distances they measured are shown in the diagram. Explain how to use their measurements to find the distance across the sinkhole.



**19. Developing Proof** Complete this flow proof by filling in the blanks

**Given:**  $\ell \perp \overline{AB}$ ,  $\ell$  bisects  $\overline{AB}$  at  $C$ ,  $P$  is on  $\ell$ .

**Prove:**  $PA = PB$

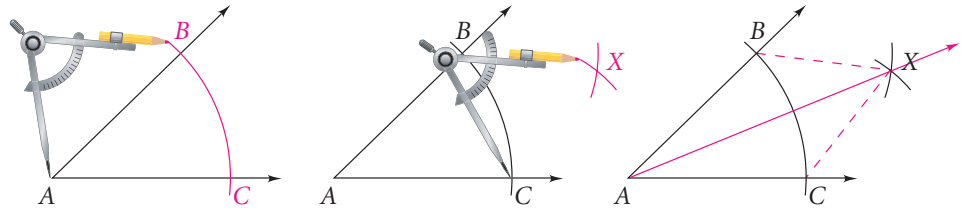


**20. Constructions** In the construction of the bisector of  $\angle A$  below,  $\overline{AB} \cong \overline{AC}$  because they are radii of the same circle.  $\overline{BX} \cong \overline{CX}$  because both arcs had the same compass setting. Tell why you can conclude that  $\overline{AX}$  bisects  $\angle BAC$ .



**Need Help?**

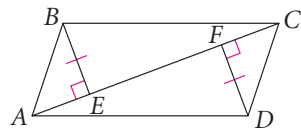
In the third diagram, what two triangles must be congruent, and why?



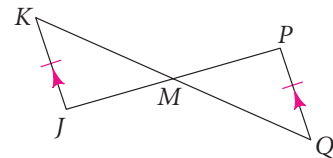
**Developing Proof** In Exercises 21 and 22, name two triangles you would prove congruent in order to use CPCTC. Tell how you would show them congruent.

**21. Given:**  $\overline{BE} \perp \overline{AC}$ ,  $\overline{DF} \perp \overline{AC}$ ,  
 $\overline{BE} \cong \overline{DF}$ ,  $\overline{AF} \cong \overline{EC}$

**Prove:**  $\overline{AB} \cong \overline{DC}$



**22. Given:**  $\overline{JK} \parallel \overline{QP}$ ,  $\overline{JK} \cong \overline{QP}$   
**Prove:**  $\overline{KQ}$  bisects  $\overline{JP}$ .



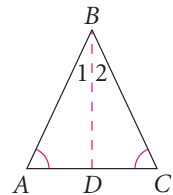
**Reading Math**

It is good strategy to read an exercise through to the end before trying to do it.

**23. Developing Proof** The reasons given in this proof are correct, but they are listed incorrectly. List them in the correct order.

**Given:**  $\angle A \cong \angle C$ ,  $\overline{BD}$  bisects  $\angle ABC$ .

**Prove:**  $\overline{AB} \cong \overline{CB}$



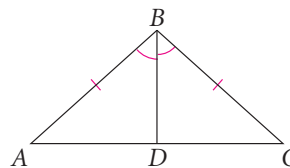
Statements	Reasons
1. $\angle A \cong \angle C$	a. CPCTC
2. $\overline{BD}$ bisects $\angle ABC$ .	b. Given
3. $\angle 1 \cong \angle 2$	c. Reflexive Property of Congruence
4. $\overline{BD} \cong \overline{BD}$	d. Definition of angle bisector
5. $\triangle ABD \cong \triangle CBD$	e. Given
6. $\overline{AB} \cong \overline{CB}$	f. AAS Theorem

**Proof** 24. Use the plan to write a paragraph proof.

**Given:**  $\overline{BA} \cong \overline{BC}$ ,  $\overline{BD}$  bisects  $\angle ABC$ .

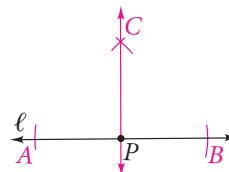
**Prove:**  $\overline{BD} \perp \overline{AC}$ ,  $\overline{BD}$  bisects  $\overline{AC}$ .

**Plan:** To show  $\overline{BD} \perp \overline{AC}$ , you can show that  $\angle BDA \cong \angle BDC$  and use the fact that congruent supplementary angles are right angles. To show that  $\overline{BD}$  bisects  $\overline{AC}$ , you can show that  $\overline{AD} \cong \overline{CD}$ . The desired congruent angles and segments are corresponding parts of  $\triangle ABD$  and  $\triangle CBD$ . So, first show that  $\triangle ABD \cong \triangle CBD$ .



25. **Constructions** The construction of a line perpendicular to line  $\ell$  through point  $P$  on  $\ell$  is shown here.

- Which lengths or distances are equal by construction?
- Explain why you can conclude that  $\overleftrightarrow{CP}$  is perpendicular to  $\ell$ . (*Hint:* Do the construction. Then draw  $\overline{CA}$  and  $\overline{CB}$ .)



### Challenge

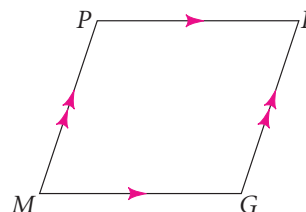
For Exercises 26 and 27, write a proof.

**Proof** 26. **Given:**  $\overline{PR} \parallel \overline{MG}$ ,  $\overline{MP} \parallel \overline{GR}$

**Prove:** Each diagonal of  $PRGM$  divides  $PRGM$  into two congruent triangles.

**Proof** 27. **Given:**  $\overline{PR} \parallel \overline{MG}$ ,  $\overline{MP} \parallel \overline{GR}$

**Prove:**  $\overline{PR} \cong \overline{MG}$ ,  $\overline{MP} \cong \overline{GR}$   
(*Hint:* See Exercise 26.)



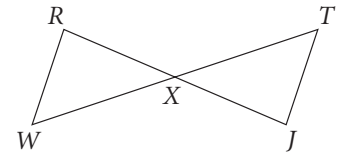


## Standardized Test Prep

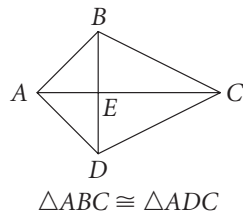
### Multiple Choice

28. In the diagram,  $\triangle RXW \cong \triangle JXT$ . Which statement is NOT necessarily true?

- A.  $\angle J \cong \angle R$       B.  $\angle W \cong \angle T$   
C.  $\overline{WX} \cong \overline{JX}$       D.  $\overline{RW} \cong \overline{JT}$



### Quantitative Comparison



Exercises 29–32

Compare the boxed quantity in Column A with the boxed quantity in Column B. Choose the best answer.

- A. The quantity in Column A is greater.  
B. The quantity in Column B is greater.  
C. The two quantities are equal.  
D. The relationship cannot be determined from the information given.

#### Column A

#### Column B

29.	$BC$	$DC$
30.	$m\angle ABC$	$m\angle DAB$
31.	$AE$	$AC$
32.	$BE$	$DE$

### Short Response

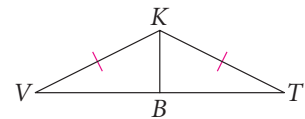


#### Take It to the NET

Online lesson quiz at  
[www.PHSchool.com](http://www.PHSchool.com)

Web Code: afa-0404

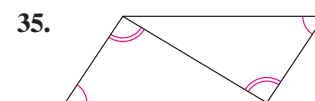
33. In the diagram,  $\overline{KB}$  bisects  $\angle VKT$  and  $\overline{KV} \cong \overline{KT}$ .  
a. What do you need to show in order to conclude  $\angle KBV \cong \angle KBT$ ? State whether it is possible to show this and justify your answer.  
b. Show that  $\overline{VB} \cong \overline{TB}$ .



## Mixed Review

### Lesson 4-3

What postulate or theorem can you use to prove the triangles congruent?



### Lesson 2-5

36. The measure of an angle is 10 more than the measure of its supplement. Find the measures of both angles.

### Lesson 2-3

If possible, use the Law of Detachment to draw a conclusion. If it is not possible to draw a conclusion, write *not possible*.

37. If two nonvertical lines are parallel, then their slopes are equal. Line  $m$  is nonvertical and parallel to line  $n$ .  
38. If a convex polygon is a quadrilateral, then the sum of its angle measures is 360. Convex polygon  $ABCDE$  has five sides.  
39. If a quadrilateral is a square, then it has four congruent sides. Quadrilateral  $ABCD$  has four congruent sides.